ABSTRACT

This invention generally relates to nanotechnology and nanoelectronics as well as associated methods and devices. In particular, the invention relates to nanoscale optical components such as electroluminescence devices (e.g., LEDs), amplified stimulated emission devices (e.g., lasers), waveguides, and optical cavities (e.g., resonators). Articles and devices of a size greater than the nanoscale are also included. Such devices can be formed from nanoscale wires such as nanowires or nanotubes. In some cases, the nanoscale wire is a single crystal. In one embodiment, the nanoscale laser is constructed as a Fabry-Perot cavity, and is driven by electrical injection. Any electrical injection source may be used. For example, electrical injection may be accomplished through a crossed wire configuration, an electrode or distributed electrode configuration, or a core/shell configuration. The output wavelength can be controlled, for example, by varying the types of materials used to fabricate the device. One or more such nanoscale lasers may also be integrated with other nanoscale components within a device.